Grounded Theory analysis of commuters discussing a workplace carbon-reduction target: Autonomy, satisfaction, and willingness to change behaviour in drivers, pedestrians, bicyclists, motorcyclists, and bus users

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Abstract

This qualitative analysis compared focus group discussions of a carbon reduction target amongst users of different modes who travel to the same workplace. Grounded Theory analysis showed discussions expanded to wider carbon costs and more issues than those specifically described in the target. Differences in people's perceptions of carbon emissions varied with travel mode: walkers and bicyclists showed high awareness and concern; car drivers and motorcyclists were more pessimistic and cautious of imposing restrictions, with a particular suspicion of 'greenwash' actions that do not provide actual benefits. Changing travel mode for carbon reduction was discussed cautiously by all groups, with concern over the legitimacy of efforts to influence a personal choice, and the need for a 'balanced' approach that wouldn't punish personal decisions. Notably, participants discussed their current mode in terms of perceived autonomy, and feared losing this autonomy if they changed mode. This role of autonomy emerged as a central theme in discussions of carbon reduction, providing ideas for future interventions.

1.1. Introduction

Despite overwhelming support by the scientific community (Cook et al., 2013), public support for the existence of anthropogenic climate change lags behind. Surveys in the UK suggest that since 2005, those who consider the world's climate to be changing has dropped by 13%, and there has been an 11% drop in those either 'fairly' or 'very concerned' about climate change (Spence, Venables, Pidgeon, Poortinga, & Demski, 2010). Beside falling support, actual scepticism that climate change exists has also risen in recent years (Whitmarsh, 2011) with increased belief that claims of climate change are exaggerated (Shuckburgh, Robinson, & Pidgeon, 2012). Reduced public support has also seen falls in willingness to change behaviour to reduce emissions; since 2006 the proportion of people willing to change their behaviour to reduce emissions has fallen from 77% to 65% (DfT, 2012). Facing falling support, despite the increasing concerns about the impact of climate change, there is a need to understand how individuals perceive changing behaviour, and how to address potential concerns.

To explore the potential for behaviour change, we wanted to examine people's consideration of a common behaviour with environmental implications, selecting travel mode choice as a topic for discussion. Private car use is the most commonly used mode of travel in Europe (European Commission, 2013). In the UK, 64% of all trips in 2010 were taken by car, accounting for 78% of total distance travelled by UK residents (DfT, 2011). With 313.2 billion vehicle miles travelled by motor traffic in 2009 (DfT, 2010), car and motor use is a serious concern for the environment: transport is the second biggest producer of carbon dioxide in the UK (behind electricity production) with 121 million tonnes emitted in 2010 (DECC, 2011), and cars and taxis create the majority of these emissions (DfT, 2010).

Even if fuel efficiency dramatically improves, engineering solutions alone will not sufficiently reduce emissions in the foreseeable future (Chapman, 2007), and nor will they do anything to reduce congestion or road injuries, meaning behavioural change is still needed to reduce car use. A shift from cars to active travel modes for shorter journeys also offers considerable public health benefits from increased physical exercise (British Medical Association, 2012). Efforts have been made to create such a shift using 'soft'

measures such as incentives or information, though the effectiveness of such interventions is still uncertain. A large meta-analysis showed a slight to moderate reduction in driving following 'soft' interventions, but also noted evidence of publication bias, rendering conclusions unreliable (Möser & Bamberg, 2008). A recent meta-analysis of a select, but rigorous, sample of best-practice research indicates no effect of interventions on car use (Walker & Thomas, *in preparation*). Literature reviews also highlight numerous methodological issues with car reduction interventions (Graham-Rowe, Skippon, Gardner, & Abraham, 2011) which perhaps explains their varied conclusions – Graham-Rowe et al. (2011) suggest only modest reductions in car use, in contrast to an earlier review of 24 case studies which suggested soft measures were cost effective and capable of 5-10% reduction in car use (Cairns et al., 2004).

Furthermore, with a gap between intentions and action on climate change (Whitmarsh, 2009a), it is uncertain how people's understanding of carbon is linked with their travel mode actions. While there is some evidence that those with stronger environmental concern are more likely to use sustainable modes (Kahn, 2007), there is very little research in understanding how users of various travel modes differ in their environmental concern (Flamm, 2009; Thomas & Walker, in review), and the link between environmental attitudes and travel mode choice remains uncertain (Gardner & Abraham, 2008; Steg & Vlek, 2009). Certainly, various studies have addressed a supposed "information deficit" (Anable, Lane & Kelay, 2006, p. 139) surrounding carbon and travel without seeing much change in behaviour. Indeed, interventions using environment-based feedback to change travel behaviour can actually lead to a reduction in environmental concern (Tertoolen, van Kreveld, & Verstraten, 1998). It seems participants reduced their concern as a way of justifying continued car use, in what appears to be an example cognitive dissonance – the process whereby mismatches between attitudes and behaviour can be resolved through attitude change, particularly when the behaviour is somehow induced (Festinger, 1962). Instead of seeing people as sitting in information deficit, and ready to act on environmental information if only they had it, research might more usefully seek to understand the complexity of personal knowledge and attitudes for environmental issues, by exploring exactly how people understand the topic at hand (Anable et al., 2006).

To understand people's motivations and views about complex issues such as emissions and travel mode choice, where we lack sufficient understanding to know exactly what ought to be measured quantitatively, qualitative methods can provide novel insights to guide future research (Schwanen, Banister, & Anable, 2011). One particular benefit of qualitative methods is that they allow participants to give more detailed answers and thereby "*overcome self-presentation biases and reveal the complexity of motivational structures*" (Gardner & Abraham, 2007, p.188). Accordingly, such methods have been used in investigations of motives for driving. For example, Mann and Abraham (2006) identified four types of satisfaction linked with car use (personal space, identity, autonomy, and experiential), and Gardner and Abraham (2007) expanded upon this by noting the blurring between utility and satisfaction; for example how the speed of a journey could lead to greater satisfaction. However, the more basic question of how people understand the role of travel mode choice and carbon emissions in anthropogenic climate change has received very little attention so far: Mann and Abraham (2006) found some reported guilt after driving, but Gardner and Abraham (2007) found no discussion of the environment by their participants, leading them to suggest the environment is not a factor when people make travel mode decisions. Chatterton et al. (2009) examined the use of carbon calculators and the environmental impact of daily behaviours: analysis of discussions saw participants describing various reasons that they personally should not reduce their car use, including concerns that changing to public transport would prove too expensive and claims that the focus ought to be on larger scale industrial emissions sources before individuals are expected to change their driving behaviours. The discussions overall revealed strong links between the use of the car and perceived freedom (Chatterton et al., 2009). As far as we are aware, Chatterton et al. (2009) is the only in-depth qualitative analysis of how people understand the environmental consequences of transport choices. This alone would justify further research in the area, but we also perceive an additional gap in the literature, which is that previous studies included no comparison between users of different travel modes. The analyses discussed above included either just car users (Gardner & Abraham, 2007; Mann & Abraham, 2006) or did not specify participants' preferred travel modes (Chatterton et al., 2009). With the possibility that users of different travel modes might hold different views, and the limited work comparing travel mode groups in their understanding of carbon and travel mode choice, this paper describes a qualitative analysis comparing

views from several travel mode groups on the discussion of emissions and travel mode, with a focus on how people consider their modal choice in the context of a carbon reduction target.

2.1 Method

2.2 Design

In order to explore and understand the relationship between modal choice and a carbon reduction target, a wholly qualitative approach was adopted. Qualitative data analysis was chosen particularly because people can misperceive environmental issues (Chatterton, et al, 2009, Whitmarsh, 2009b; Whitmarsh, et al., 2011), and articulate the relationship between environment and transport in a variety of ways (Chatterton et al., 2009), meaning quantitative questions risked misunderstandings or self-presentation biases. Focus groups were used to allow participants to respond to each other's comments, helping to generate new concepts, while also placing their comments within wider social practices. An emergent Grounded Theory (GT) approach was used (Babchuk, 2010), in order to allow participants to express their opinions and views on the topic, even if these were somewhat distant from those suggested by the researchers. It was felt that such a distance would enable more, and more representative, themes to emerge than if discussion were more constrained by the researcher. The emergent GT approach followed guidelines from Glaser and Strauss (1967), and Glaser (1978, 1992). In brief, GT was developed by Glaser and Strauss (1967) in rejection of previous 'grand theories', to develop new theories to explain phenomena through deep immersion in the data. The emergent method chosen for this study favours the original, so-called 'Glaserian' approach, which places a stronger focus on the bottom-up extraction of themes, without the use of predetermined frameworks favoured by Strauss and Corbin (1990).

2.3 Participants

Participants were staff and students from a campus-based university in the United Kingdom who self-identified their main travel mode to campus. The university is located on a hill at the edge of small city, and has good car access, though limited parking is available. Several bus companies provide regular services to the campus, and the campus has good walking and cycling links. The university has a travel

plan in place to encourage sustainable travel modes, and had recently implemented a carbon reduction target. From a Travel Survey at the time of the focus groups, the modal share for the university is shown in Table 1.

Mode	Total Sample	Staff	Students
Car	38.3%	67.5%	13%
Bicycle	36.1%	9.2%	59.2%
Bus	6.8%	6.6%	7.1%
Walk	12.6%	8.1%	16.4%
Motorcycle	1.4%	2.2%	0.8%
Other	4.8%	6.4%	3.5%

Table 1: Modal split of travel mode use at time of focus groups

Participants were recruited through public advertisements and emails to the university bicycle and motorcycle user groups. Participants were offered £5 incentive for their time. Six focus groups were held with 27 participants: two focus groups with bicyclists (because of higher volunteer numbers) and one focus group each for car users, bus users, motorcyclists and walkers. Groups were kept unimodal in this way to explore views specific to each mode, without the risk of these views being challenged by users of different modes. The majority of participants identified themselves as 'White British', with the exception of one 'Irish', one 'British/Scandinavian' and two preferred not to reveal. Demographics of each group are outlined in Table 2.

Group	**# Participants**	**Age Range**	**Gender**
Bicyclists (1)	3	22 - 38	3 Male
Bicyclists (2)	6	38 - 65	4 Male, 2 Female
Motorcyclists	5	23 - 60	5 Male
Car Users	6	25 - 53	4 Male, 2 Female
Bus Users	4	20 - 62	1 Male, 3 Female
Walkers	3	41 - 52	3 Female

Table 2: Demographics of participants within the focus groups

Using a semi-structured approach, six statements were used to prompt discussion. Statements addressed (a) whether travel mode changes could assist the university's public carbon-reduction target, which seeks to reduce CO2 emissions by 40% over 10 years; (b) whether senior management should use environmentally friendly travel; (c) whether walking was a legitimate travel mode choice; (d) which travel modes should be most supported by the university; (e) how satisfied were people with their

current travel modes; and (f) what recommendations for travelling to and from the university people would give to new colleagues or students (this latter question was included to encourage people to reflect more generally on travel behaviour, without having to think about how any issues would affect them personally). The lead researcher introduced the statements in the order given above, with each presented to the group once the previous topic had drawn to a close, or when time dictated that the session move on (each statement was allocated up to 10 minutes for discussion). Participants were asked for their views on the topics introduced, and informed that all responses were valid and would be recognised. Groups lasted between 45 and 55 minutes, and were recorded and transcribed verbatim by the lead researcher.

2.4 Analysis

In line with emergent GT, transcripts were read several times to become familiar with the text, with salient points coded in two steps: substantive and theoretical (Glaser, 1978). Substantive coding involves coding items in the text with straightforward terms, ideally line-by-line (Willig, 2008). Coding individual items allows the emergence of categories - themes that help explain the data. Categories emerge through *constant comparison* – a defining characteristic of GT – identifying codes in the data and constantly comparing them to previously identified codes, thereby revealing patterns in the data and allowing new categories to emerge where statements do not fit any of the currently identified categories (Glaser, 1992). Once categories have thus been developed, the second stage of coding began, defined as *Theoretical Coding*. Again using constant comparison, links were sought between categories, allowing them to be developed into a larger framework. Categories developed in the substantive coding exercise were merged and combined during the theoretical coding stage to form superordinate themes that would eventually develop into the three main themes. Eventually a point was reached where new data only supported previously determined concepts without introducing new ideas – a state called *saturation,* which signals the end of the coding exercise. Parallel to the coding process is the constant writing of *memos* – ideas on themes and relationships between codes. A key component of GT, these memos help capture subtleties seen within the data during the substantive and theoretical coding phases for later use. Once saturation had been reached, the analysis was written up by integrating individual

substantive codes within the larger theoretical codes, guided by the memos, into a grounded theory that contained three general themes under an overarching theory. Even during this period of writing up, constant comparison continued to explore links within the data, refining the categories and theory, until we were satisfied there were no more themes in the data.

3.1 Findings

The analysis presented three main themes: 'Carbon reduction and transport', 'Changing travel mode', and 'Own travel mode choice'. A clear common topic across the five travel mode groups was the need and appreciation for personal autonomy – the ability to make a choice that granted the individual a feeling of control over their travel. Accordingly, we now show how, in each of the three main themes, mode user groups contrasted and agreed upon discussions of climate change and transport, and how the central theme of autonomy emerged in each area.

3.1.1 Carbon reduction and transport

Though arguably having a greater contribution to carbon emissions than other modes, car users expressed general support for a "green future", and motorcyclists similarly understood and accepted the need to reduce emissions. But despite general support, car users critiqued several aspects of the workplace carbon reduction target, questioning its accuracy and the lack of consultation with travel mode groups. Application of the target also became contentious, with fears that car users would become an easy target for management. Similarly, motorcyclists were somewhat in favour of reducing carbon dioxide and the target more specifically, but again were more concerned with the effect on individuals:

> *(Motorcycle: 16-19) Ben: "…I agree I think the university has to look at all ways of to reduce it, so the carbon footprint with energy management and also this, transport, trying to encourage people to travel to and from the university in the most, economical, and convenient way for the individual"*

Car and motorcycle users named several alternative areas for reducing carbon rather than changing their own travel behaviours. Electricity and building emissions were a source of contention, as they felt that any efforts to change travel mode away from motorised forms would be overshadowed by, and make

little difference because of, far greater energy losses in the workplace. A recurring phrase for motorcyclists and car users was '*joined-up thinking*': a need for collaboration in reducing emissions across different areas before tackling travel mode choice, perhaps as a means to further distance themselves from forced change by highlighting another area for targeting. Excess electricity use and heat loss through improper insulation were also concerns for active mode users (walkers and bicyclists), but for different reasons. With a more positive attitude towards reducing emissions than car users, issues with wastage were raised by walkers and bicyclists partly out of greater environmental concern but also from resentment that energy loss through buildings undermined the carbon savings they had made through their low-carbon travel behaviours:

> *(Walking: 195-199) Emma: "…but also there's a part of me that thinks why should we help… why should we help the university reduce their carbon footprint because they've been… have been coming around the department… looking at where they could put big, TV screens up"*

Building on the discussions of suitable areas for reducing emissions, groups were unified in their contempt for false action to reduce environmental damage. Described by car users as actions performed *"ostentatiously"* or as a *"PR stunt"* to achieve a desirable public image, rather than real reductions in carbon emissions, participants voiced concern about 'Greenwashing', as illustrated by this bicyclist:

> *(*Bic*ycling 1:9-12) Scott: "No, I think it's bullshit, its greenwash, they're just building new car parks; they do nothing to discourage people driving by car it's just, um what's the word?" (Mark: "It's a ruse") Scott: "Yeah, it's a ruse, yeah"*

Building on the deceptive connotations of the word *"ruse"*, others described a belief that actions may be taken as a risible *"token"*, or *"lip service"* which fails to support active modes or which neglects environmental impact. All groups disliked the false nature of greenwashing and identified real or possible examples, but their dislike stemmed from different reasons: active mode users were annoyed that their efforts to reduce carbon dioxide emissions were overshadowed by wasted electricity, whereas other mode groups were cautious of changing their behaviour (of effectively making "sacrifices", as some might see it) if this wouldn't be adequately supported.

3.1.2 Changing travel mode

The practicalities of changing mode choice to reduce emissions were considered: though some were optimistic that change to reduce carbon emissions was possible, the majority of participants recognised the difficulty in changing car users' behaviour. Groups felt there were many physical and contextual *"reasons"* or *"excuses"* car users would struggle to overcome; these were also frequently discussed by car users themselves, who felt powerless to change, driving to work *"because we have to"*. The rationale for this was usually tied to living locations and their perceived distances from the workplace.

But as well as the instrumental issues mentioned by car users (distance, cost, time), non-car users felt there were psychological barriers blocking travel mode change in those who usually drive. They described beliefs that car use had become routine or habitual, and that car users had deeply-ingrained prejudices against alternative modes:

> (*Bicycle1: 40-45) Mark: "…[At other workplaces] there's been more of a move to persuading people to take buses, or to walk, or to cycle…whereas here it's just a foregone conclusion, it has to be crazy to cycle or even walk up the hill, and it's just accepted"*

Non-car users also felt social norms encourage people into cars, and cultural shifts would be needed for change to occur in drivers. The situation was not seen as static, however: participants felt that wider context changes, such as rising fuel costs, may eventually force people into change. This idea was particularly voiced by the motorcyclists, who suggested that economics and rising fuel costs could encourage behaviour change without impeding personal choice:

> *(Motorcycle: 492-493) Ben: "maybe we don't need to have it university-led… maybe we just let economics lead… which is what it's doing now"*

For change to occur, groups were also in favour of upper management *"leading by example"* (*Motorcycle: 403/Walking: 242),* clarified by one bus user:

> *(Bus: 113-119) Fay: "… it's only hypothetical but I think that's the best way, like to cause a reaction because if you're sort of, trying to promote policies then it has to come from the top down I think to be taken… seriously"*

Again there was a split between the groups in how this was viewed. Car users supported the idea of leadership on mode change, but voiced unease about how this could be accomplished. Having senior management use sustainable modes was seen as potentially wasting time and money. One car user remarked that *"the devil would be in the detail"* and others questioned the precedent for future employees: would they be forced into a certain travel modes as part of their employment contract? Bicyclists, on the other hand, felt leadership could help with public perceptions of 'green' travel modes being associated with low social standing, but expressed strong scepticism that it may fall back into Greenwash. Discussion of whether mode change was possible often led to the wider question of whether it was legitimate to influence a personal choice outside of the work environment. Car and motorcycle users directly questioned the right of management to influence this aspect of their lives:

> *(Motorcycle: 28-30) Alex: "…the question is, to what extent the university should play a role in, having, their employees change their behaviour, because that's really the question"*

The threat of management *"impinging"* on several areas of personal life was echoed by car users disliking management's perceived "*interference"* in their personal lives, as well as viewing personal choices in location and travel as "none of [*management's*] *business*" and management being *"abusive"* in changing travel behaviour. In contrast, active mode users encouraged influencing modal choice without any discussion of the validity of doing so; instead they felt management should be *more* proactive in changing people's behaviour. But active mode users did not go so far as supporting enforced change; rather, they felt management's role should be encouraging, not dictating, people towards more sustainable modes:

> *(Walking: 282-286) Lily: "But I guess if it was linked to something positive like helping the environment or helping their fitness or whatever… then maybe it wouldn't feel like a punishment it would just feel like an active choice they were making to moving towards something positive"*

This recognition of the need to respect individual choice and autonomy was also evident in how bicyclists wanted people to try their modes to overcome preconceptions:

*(*Bic*ycling1: 948-950) Jim: "…but that's a mental thing and y'know, I'm not going to start to try to break my friends into it, but what I am trying to do is just, demonstrate that it's, you can have a go, and get a good idea yourself, y'know it's just all about awareness"*

In contrast to all other groups, car users described how they wanted material incentives or benefits before they would consider changing their behaviour. Though car users begrudgingly accepted that car-use reduction could occur in limited circumstances, they individually continued to distance themselves from change, suggesting that whilst there was a sub-section of car users who would be able to reduce their driving, they themselves did not fall into this group.

Finally, a point made repeatedly when discussing other modes concerned how they were viewed as offering less control over one's journey compared to each participant's current mode. Whilst it was generally agreed – even by car users themselves – that the bus was the logical alternative to the car, the car users in these focus groups were strongly against using the bus themselves. The cost of buses was variously described by drivers as "*incredibly"*, "*exorbitantly"* and "*shockingly"* expensive. Those with some experience of using the bus had similarly strong impressions of dealing with strangers *"squeezed up next to you"* and a perceived risk of catching germs, matching similar impressions reported by Stradling et al. (2007). In particular, the idea of using the bus was largely rejected by car users for the loss of control compared to car use – with regard both to journey time (not knowing when the bus would arrive, and whether it would have free seats) and to one's immediate surroundings (having to mix with strangers), again corroborating other reports of low perceived control for buses (Anable & Gatersleben, 2005; Stradling et al., 2007)..

The fear of losing control and autonomy by changing travel mode wasn't limited to car users however; cyclists felt cars prevented people from experiencing the open world, trapping them *"in a little box"* to be frustrated by traffic over which one had no control:

*(*Bic*ycling 1:732-736) Mark: "That's something that, but people just don't want to give up their… perceived freedom… but often it isn't freedom, it's entrapment"*

Yet whilst regular bicyclists felt their mode offered them freedom, bicycling was framed by other groups as a dangerous activity; some car users expressed interest in bicycling but were held back by safety concerns, feeling that bicycling was *"lethal"*. Discussion from walkers similarly showed a perception of stress and danger in bicycling, particularly with the absence of segregation from motorists:

> *(Walking: 641-646) Sue: "…it's pretty stressful and you're in a completely different environment once you step out off the pavement… onto that black tarmac it's like a different world really"*

The time taken for showers and the lower speed of bicycling compared to driving were cited by car users as additional ways in which control might be lost, suggesting it was *"pure luck"* how long it would take to bicycle to work, matching the perceptions of Anable and Gatersleben's car users, who similarly saw bicycling having low predictability (Anable & Gatersleben, 2005).

In contrast, car users showed some positive views about the possibility of walking: *"if we could walk to work easily we would"*. But interest in walking as a means of transport was far from universal amongst the car users. In one rather extreme statement:

> *(Car: 1214-1215) Josh: "Anything else is Third World, asking me to walk five miles to and from work it's ludicrous it's never going to happen"*

3.1.3 Own Travel Mode Choice

When people discussed their own current modes, this was largely focused on enjoyment. Bicyclists' enjoyment stemmed from physical exercise giving a *"very accomplished feeling"*, being outdoors in nature and experiencing positive mental effects on mood and thinking time – echoing some of Spinney's (2009) findings on how important the affective experience is when understanding the use of that mode. Walkers were similar to bicyclists: a strong appreciation for nature, fitness, and mental health ran through both groups' discussions of motivation. Walkers additionally expressed satisfaction with their mode because of its simplicity: bicycling required external machinery while walking did not, and was therefore seen as easier.

For motorcyclists, the most popular reason for commuting by bike was the thrill and excitement of motorcycling:

(Motorcycle: 961-964) Dave: "From my point of view, every time I get on the bike I get a buzz just thinking 'Ah I'm just going out on the bike' y'know… It's, it's in the blood"

Car users enjoyed the time their journey offered, giving a chance to clear their heads, or start their day afresh. The social aspect of car-sharing was praised, with the caveat that the person they car-shared with must be familiar and not a stranger – an idea which echoes earlier work on car sharing with colleagues with whom one has only limited personal connection (Laurier et al., 2008). The clearest indication of enjoyment for car use was in discussions of freedom and the love of driving:

(Car: 1294) Zoe: "I'd give up food, yeah, to carry on driving, I would"

Such favourable views are in stark contrast with the experience of bus users who discussed this theme of enjoyment purely through its absence. Described by one participant as *"deeply unsatisfying"*, bus journey descriptions were uniformly negative with various issues raised, including the cold, the smell, other people, ticket costs, and the time involved (see also Anable & Gatersleben, 2005; Stradling et al., 2007). Whereas, as described above, users of all other modes felt they currently had control over their journeys and would lose this if they switched to another mode, bus users were unique in feeling they had limited control over their present journey – they felt buses ran to the driver's timetable and not their own, without knowing for certainty when buses would arrive. They sometimes watched full buses drive pass without stopping, (see also Jain, 2011), and had problems with journey lengths varying considerably from day to day, experiencing particular frustration when stuck inside a bus that was running late. Discussions of the cold, smell and proximity to other people also highlighted a lack of control over the surrounding environment (see also Clayton, 2012). Bus users described themselves as a *"captive audience"*, unable to enact change or influence the problems they faced.

Objectively, car users are just as helpless as bus users when stuck in traffic. It is therefore interesting that car users described how they felt they could regain a sense of control through predicting traffic issues or engaging in a form of distracting parallel activities:

(Car: 1118-1121) Anne: "I know they're there, yeah" (Josh: "-I find it very predictable")

Anne: "You've got the radio on so you're used to it, sit back I forget all about it so, yeah no it's fine"

Bus users, in contrast, didn't have this coping mechanism - uncertainty about their trips made it impossible to predict and control the situation. In fact, discussions from bus users contained several instances where they had tried and failed to gain control. For example, there was a case where a participant bought a ticket that was invalid for the competing companies' bus service running the same route:

(Bus: 891-893) Fay: "You put your foot down and you just say 'Nah I'm going to wait' but then, you just wait for ages, sometimes I'm like 'No I'm not going to get [the rival bus], I've paid for <u>this</u> bus pass', but then you just end up waiting so long"

Even attempts to take control by walking short distances to other, less busy, bus stops further along the route failed because buses were full by the time they arrived. These experiences reported by bus users, which almost suggest a kind of learned helplessness (Maier & Seligman, 1976) after repeated efforts to regain control have always foundered, stand in dramatic contrast to the users of other modes, who, as mentioned above, often discussed their feelings of control and the benefits these brought. One bicyclist summarised the control he perceived in his chosen mode thus:

(Cycling1: 833-835) Scott: "…if you get anything in front of the cyclist you can either overtake it or get off and push it or whatever, you're not caught up by things, and the frustration is just not there"

4.1 Discussion & Conclusions

Emergent Grounded Theory analysis was applied to focus group discussions from users of five different travel modes, who each travelled regularly to the same place, discussing modal choice in the context of a recent carbon dioxide reduction target. Analysis showed that car and motorcycle users were apprehensive about the threat of carbon emissions being used to force travel mode change and questioned whether management held authority to change a personal choice. Walkers and bicyclists

were united in their greater concern about carbon emissions, but recognised the need for a careful approach to encourage and not dictate the use of sustainable travel modes. Car users, bicyclists, motorcyclists and walkers all worried they would lose control and autonomy if they switched mode, and promoted their current mode for its ability to overcome obstacles, suggesting a close relationship between perceptions of autonomy/control on the one hand and satisfaction on the other. This relationship was further supported by the negative case of bus users, who expressed strong displeasure with their journeys arising from their inability to predict, control, or have influence over them.

The analysis showed that, when asked to consider carbon reduction through transport mode change, people were fond of discussing other, larger sources of emissions, though we establish two probable motives for this: as a defence mechanism, justifying continued driving or motorcycling (as Chatterton et al., 2009, also suggested), and, amongst users of low-carbon modes, as a critique of how their own carbon savings are not supported by wider institutional action. Though car users saw their choice as essential and thereby almost non-negotiable (again in accord with Chatterton et al.), the results here also show that non-car users described such behaviour either as a set of 'excuses' or as part of deeper psychological (habitual) or cultural influences upon behaviour. A new element to emerge here was the apparent difference in environmental concern and discussions of carbon among groups, despite all groups declaring understanding of environmental issues. For car drivers and motorcyclists, emission targets were a challenge to their behaviour to be attacked, while other groups saw opportunities for reducing waste as a productive aspect, and encouraged more efforts to reduce unsustainable travel modes. With different views toward specific environmental policies, despite explicit statements of broad support, our analysis may explain the lack of differences between travel mode users in general measures of environmental concern (Thomas & Walker, in review). Future work employing more specific measures for personal views of environmental concern may be required to clarify the existence of differences between travel mode users.

Though the aim was to explore carbon concern in the domain of transport, a surprising finding was that discussions of emissions and mode choice were strongly linked to personal autonomy. The importance of freedom and autonomy in car use is supported by other qualitative reports (Chatterton et al., 2009;

Ellaway, Macintyre, Hiscock, & Kearns, 2003; Gardner & Abraham, 2007; Hiscock, Macintyre, Kearns, & Ellaway, 2002; Mann & Abraham, 2006). Alternative modes of travel have also been linked to a need for autonomy, including cycling (Daley & Rissel, 2011) or the loss of control when using public transport (Beirao & Cabral, 2007). This is the first time that autonomy has been explored in such a tightly matched design, where people travelling to the same workplace using different modes were compared. The fact that it emerged as a common thread when people were ostensibly discussing carbon emissions gives additional weight to the importance of autonomy when maintaining mode choice, and the how mode change might be difficult to effect. The importance of autonomy in daily life is linked to increased well-being and happiness (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) and autonomy, independence and perceived freedom are also recognised as motivations for travel mode choice, identified as affective needs of travel by Musselwhite & Haddad (2010). The emergence of autonomy as a key theme in a discussion that was originally about carbon reduction also illustrates the strength of qualitative methods - with their capacity to allow the unforeseen to emerge - for working in areas like this.

An original contribution from this paper is highlighting how users of all modes except the bus not only felt their mode gave them high levels of autonomy but also feared losing this if they changed mode. Influencing travel behaviour can be a source of contention (Tertoolen, van Kreveld, & Verstraten, 1998) and methods for change are judged for their capacity for fairness and freedom (Eriksson, Garvill, & Nordlund, 2006), something that became evident here in the concerns of those targeted for change (car users) but also for those wishing to promote their own modes to a wider audience (bicyclists and walkers). This illustration of how important autonomy is within travel mode choice shows how caution must be taken in future interventions. Indeed, the general impression from car users suggests strong perceptions of persecution; they were found to be challenging targets and authority, dismissing efforts to encourage behaviour change, expecting incentives for change, separating themselves as being the group most unable to change and identifying car use as the only possible choice open to them. Recognising themselves as the likely target, it appears the car drivers in this study had bunkered down to resist any form of change.

To tackle the problem of car users' resistance to change, and their need for incentives, the importance of autonomy across modes may present a solution. Car advertisements often use emotive appeals rather than instrumental application to advertise cars (Bayley, Emerson & Wright, 2009). As reported by Chatterton et al. (2009), car use is linked to the perception of freedom, and any attempts to reduce the perceived autonomy linked to car use would likely be resisted. Efforts to reduce car use, then, are likely to work better if alternative modes are promoted as sources of greater autonomy. Drawing on Kahneman and Tversky's (1979) Prospect Theory, anticipated regret from a decision (e.g., anticipated loss of autonomy) leads to more conservative actions (Mellers & McGraw, 2001), and builds support for the idea that current behaviours are acceptable, even if alternatives could be beneficial (Anderson, 2003). Walkers and bicyclists in this study reported high levels of autonomy from flexible route-taking, lack of congestion and other time constraints, leading to highly predictable journey times. Given that the bus was seen as the most logical alternative to the car in this study, even by car users themselves, it is likely that a shift to the bus might best be aided by infrastructure improvements to remove uncertainty from these journeys, thereby boosting perceptions of autonomy. Live updates of arrival times for public transport have been linked to reduced stress and lower perceived waiting times (Schweiger, 2003), as well as increased feelings of security and control (Science Applications International Corporation, 2003). Dedicated bus lanes are another infrastructural mechanism that might remove journey time uncertainty and so reduce feelings of lacking control, thereby making changes from car to bus more likely to take place.

This analysis is unique in comparing a range of travel mode groups through a qualitative method. The strength of this study stems from allowing five different groups, making similar journeys to the same place, to discuss their choice with minimal influence by the researcher. The research does have some limitations. There are no set numbers required for focus group research (Barbour, 2007) and groups with as few as 3 participants have previously shown interesting and valid results (Barbour, 2007; Bloor, Frankland, Thomas, & Robson, 2001). But while focus group results are not directly generalisable and do not require representative sampling (Stewart, Shamdasani, & Rook, 2007), small group numbers may promote consensus among groups that could limit the breadth of discussion (Bloor et al., 2001).

Additionally, homogenous group structures (e.g., including only women or only users of one mode) may encourage group cohesion for more detailed discussions (Barbour, 2007). There is however the chance that discussion will not be as varied as when groups include variation in gender (Stewart et al., 2007) or viewpoints (Bloor et al., 2001). The current results demonstrate a range of views and findings, though further investigation of varied samples, using heterogeneous group structures of gender or mode choice, could provide additional insights. Focus group research generally understands groups as individual units for analysis (Barbour, 2007; Smithson, 2008), though expanding research to account for individual views, such as interview approaches, may develop greater understanding of the topic at hand. For example, it remains uncertain whether the views expressed originate from chosen modes, or whether personal characteristics (e.g., values, personality) are the source of such views, and interview methods may address this focus. Qualitative research also opens new areas for study, and as this research supports and extends previous findings about autonomy's importance, empirical testing of the role of autonomy, whether through implicit measures (e.g. Steg, Vlek, & Slotegraaf, 2001) or through testing interventions focused on perceptions of autonomy, could provide stronger evidence to test these claims. Also, as our sample came from staff and students at a United Kingdom university, it does not include opinions from those from different socio-economic backgrounds who may view travel mode choice differently. Research from the United Kingdom's Department for Transport (Thornton, Bunt, Dalziel, & Simon, 2010) showed substantial differences between socio-economic groups on such questions as whether driving a car or using public transport was seen as a sign of success (the relationship was such that those in lower socioeconomic brackets were more likely to associate car use with success). Extending our research to include further demographics would be useful for testing the theory presented here and for extending the analysis to new areas, including rural/urban and age differences.

In conclusion, this paper presents a novel exploration of carbon and travel mode choice across users of several travel modes making regular commuting journeys to the same workplace. Group differences became apparent: car and motorcycle users felt apprehensive about carbon-reduction targets, whereas users of sustainable travel modes showed cautious optimism. Travel mode change was seen as possible,

but all were careful not to deny autonomy in changing behaviour. Whether people walked, bicycled, drove a car or rode a motorcycle, they felt they currently had autonomy and would lose this – and as a result experience less journey satisfaction – if they changed to any other mode. This relationship between travel mode, autonomy and satisfaction is a potentially important area for further research and insights from exploring this relationship might allow the creation of better transport-mode-change interventions which specifically target satisfaction and perceptions of control – not least by alleviating motorists' fear of losing autonomy if they were to switch to more sustainable modes.

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